

Exercise-Induced Asthma

ALTHOUGH THE CAUSES of exercise-induced asthma are still unknown, there are two theories that are best supported by clinical observation. One postulates that exercise leads to water loss in the airways, inducing the release of inflammatory mediators that stimulate bronchospasm. The second theorizes that cooling of the airways by exercise causes changes in blood flow in the bronchial circulation that also induce the release of bronchospastic mediators.

Three classes of drugs have been adopted by the International Olympic Committee for exercise-induced asthma: agonists, cromolyn sodium, and theophylline. Aerosolized steroids have not been shown to be helpful in exercise-induced asthma unless administered over a four-week period before exercise. Theophylline has been effective only in patients who use it long term. Recent studies have attempted to establish the efficacy of experimental longer-acting β_2 -agonists and cromolyn in exercise-induced asthma. One showed improved protection from this disorder when using long-acting cromolyn and nedocromil compared with cromolyn alone.

Although we still have much to learn about it, the following is recommended for the management of exercise-induced asthma. The diagnosis is made by showing a 15% fall in the forced expiratory volume in one second or the peak expiratory flow rate monitoring at 0, 3, 5, 10, 15, or 20 minutes after 6 minutes of strenuous exercise. Specific information from the history, obtaining positive histamine or methacholine challenge tests, or demonstrating adequate responses to therapeutic trials of drugs effective in treating exercise-induced asthma can also help make the diagnosis.

Most persons who suffer from exercise-induced asthma respond to two inhalations of a β_2 -agonist (short or long acting) administered five to ten minutes before exercise. Salmeterol (long-acting β -agonist) seems to provide longer protection than the shorter-acting β -agonists (albuterol). For more difficult cases, prolonged protection can be obtained by combining cromolyn or nedocromil with β_2 -agonists. No difference in efficacy was found between cromolyn and nedocromil, and therefore, either one can be used. A trial of ipratropium bromide in metered-dose inhalant form, in combination with β_2 -agonists or cromolyn sodium or both, can be of some benefit. Both β_2 -agonists and cromolyn sodium are available in metered-dose inhalers, in capsule form specifically designed for spinhalers, and in solutions for nebulization. The oral administration of β_2 -agonists has not been effective in the treatment of exercise-induced asthma.

For those patients with more severe exercise-induced asthma, it is recommended to choose a sport that requires less exertion—that is, swimming, downhill skiing, and recreational cycling as opposed to running, cross-country skiing, and bicycle racing. It is also recommended to undergo a brief warm-up period before engaging in more intense exercise and a warm-down after completing exer-

cise. The abrupt onset and sudden cessation of exercise puts persons more at risk for exercise-induced asthma. Finally, patients who have exercise-induced asthma and who are sensitive to airborne pollens should not undergo strenuous exercise outdoors during the high-pollen season.

Several additional factors are known to exacerbate the response to exercise in patients with asthma and should be kept in mind in the prevention of this disorder. The more severe the underlying asthma, the greater the adverse response to exercise in asthma. The longer the duration of exercise, the greater the risk of it inducing asthma (this applies to the intensity of exercise as well). Exercise-induced asthma is much more likely to be provoked in cold and dry weather conditions.

ETAN MILGROM, MD
Los Angeles, California

REFERENCES

- de Benedicts, Tuteri G, Pazzelli A, Bertotto A, Bruni L, Vacarro R: Cromolyn versus nedocromil: Duration of action in exercise-induced asthma in children. *J Allergy Clin Immunol* 1995; 4:510-514
- Inman MD, O'Byrne PM: The effect of regular inhaled albuterol on exercise-induced bronchoconstriction. *Am J Respir Crit Care Med* 1996; 1:65-69
- Kemp JP, Dockhorn RJ, Busse WW, Bleecker ER, Van As A: Prolonged effect of inhaled salmeterol against exercise-induced bronchospasm. *Am J Respir Crit Care Med* 1994; 150:1612-1615
- Woolley M, Anderson SO, Quigley BM: Duration of protective effect of terbutaline sulfate and cromolyn sodium alone and in combination on exercise-induced asthma. *Chest* 1990; 9:39-45
- Wright LA, Martin RJ: Nocturnal asthma and exercise-induced bronchospasm: Why they occur and how they can be managed. *Postgrad Med* 1995; 6:83-90

Osteoporosis—New Techniques for Screening, Diagnosis, and Clinical Monitoring

OSTEOPOROSIS is a major public health problem that already affects 25 million Americans, is responsible for about 1.5 million fractures annually, and has been estimated to result in direct and indirect health care expenditures of \$10 billion annually. The National Osteoporosis Foundation estimates that half of all women older than 50 years will have an osteoporosis-related fracture. Men are also at risk, with a 5% lifetime risk of hip fracture.

Bone is continuously resorbed and formed throughout life in the process of remodeling or turnover. After ages 30 to 40, resorption exceeds formation, resulting in net bone loss in older women and men. In perimenopausal women, estrogen deficiency results in more rapid bone loss for five to ten years after menopause. Osteoporosis occurs when bone loss is sufficient to cause mechanical weakness and increased risk of fracture. Bone loss cannot be reversed, but the likelihood of complications can be minimized by identifying patients, even older ones with high rates of bone turnover and low bone density, and by intervening to slow or stop net bone loss.

The incidence of osteoporosis is expected to rise even further as the population ages. It is, therefore, imperative to identify the persons most at risk for bone loss and fracture. Risk factors and causes of secondary osteoporosis, such as hyperthyroidism, hyperparathyroidism, or treatment with